Agency for Healthcare Research and Quality
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NATIONAL QUALITY MEASURES CLEARINGHOUSE

General

Title

Hospital-wide readmission (HWR): hospital 30-day, all-cause, unplanned risk-standardized readmission rate (RSRR) following hospitalization.

Source(s)

Yale New Haven Health Services Corporation (YNHHSC), Center for Outcomes Research and Evaluation (CORE). 2017 all-cause hospital-wide measure updates and specifications report. Baltimore (MD): Centers for Medicare & Medicaid Services (CMS); 2017 Mar. 69 p.

Measure Domain

Primary Measure Domain

Related Health Care Delivery Measures: Use of Services

Secondary Measure Domain

Does not apply to this measure

Brief Abstract

Description

This measure estimates a hospital-level 30-day risk-standardized readmission rate (RSRR) for patients discharged from the hospital after admission for any eligible condition. The outcome is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission. A specified set of planned readmissions do not count as readmissions.

The measure reports a single summary RSRR, derived from the volume-weighted hospital-level standardized risk ratios (SRRs) for the five specialty cohorts based on groups of related discharge condition categories or procedure categories: surgery/gynecology, general medicine, cardiorespiratory, cardiovascular, and neurology.

The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for individuals who are 65 years and older and are Medicare Fee-for-Service (FFS) beneficiaries hospitalized in non-federal short-term acute care hospitals (including Indian Health Services hospitals) and critical access hospitals.

Rationale

Readmission following hospitalization is a costly and often preventable event. While it is helpful to assess readmission rates for specific groups of patients, these conditions account for only a small proportion of total readmissions. By contrast, a hospital-wide, all-condition readmission measure could provide a broader assessment of the quality of care at hospitals. Therefore, the Centers for Medicare & Medicaid Services (CMS) has contracted with Yale New Haven Health Services Corporation/Center for Outcomes Research and Evaluation (YNHHSC/CORE) to develop a claims-based, risk-adjusted hospital-wide readmission (HWR) measure for public reporting that reflects the quality of care for hospitalized patients in the United States.

Hospital readmission, for any reason, is disruptive to patients and caregivers, costly to the healthcare system, and puts patients at additional risk of hospital-acquired infections and complications. Readmissions are also a major source of patient and family stress and may contribute substantially to loss of functional ability, particularly in older patients.

Some readmissions are unavoidable and result from inevitable progression of disease or worsening of chronic conditions. However, readmissions may also result from poor quality of care or inadequate transitional care. Transitional care includes effective discharge planning, transfer of information at the time of discharge, patient assessment and education, and coordination of care and monitoring in the post-discharge period.

Given that studies have shown readmissions within 30 days to be related to quality of care, that interventions have been able to reduce 30-day readmission rates for a variety of specific conditions, and that high and variable readmission rates indicate opportunity for improvement, it is reasonable to consider an all-condition 30-day readmission rate as a quality measure.

Evidence for Rationale

Yale New Haven Health Services Corporation (YNHHSC), Center for Outcomes Research and Evaluation (CORE). 2017 all-cause hospital-wide measure updates and specifications report. Baltimore (MD): Centers for Medicare & Medicaid Services (CMS); 2017 Mar. 69 p.

Primary Health Components

30-day hospital-wide all-cause unplanned readmission rate

Denominator Description

The measure cohort consists of admissions for Medicare Fee-for-Service (FFS) beneficiaries aged 65 years and older and discharged from non-federal acute care hospitals and critical access hospitals.

Admissions are assigned to one of five mutually exclusive specialty cohort groups consisting of related conditions or procedures. For each specialty cohort group, the standardized readmission ratio (SRR) is calculated as the ratio of the number of "predicted" readmissions to the number of "expected" readmissions at a given hospital. For each hospital, the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix and service mix.

See the related "Denominator Inclusions/Exclusions" field.

Note: This outcome measure does not have a traditional numerator and denominator like a core process measure; thus, this field is used to define the measure cohort.

See the *2017 All-cause Hospital-wide Measure Updates and Specifications Report: Hospital-level 30-day Risk-standardized Readmission Measure* for more details.

Numerator Description

This measure counts all unplanned readmissions to an acute care hospital, from any cause, within 30 days from the date of discharge from an index admission.

For each specialty cohort group, the standardized readmission ratio (SRR) is calculated as the ratio of the number of "predicted" readmissions to the number of "expected" readmissions at a given hospital. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted based on the hospital's performance with its observed case mix and service mix.

See the related "Numerator Inclusions/Exclusions" field.

Note: This outcome measure does not have a traditional numerator and denominator like a core process measure; thus, this field is used to define the measure cohort.

See the *2017 All-cause Hospital-wide Measure Updates and Specifications Report: Hospital-level 30-day Risk-standardized Readmission Measure* for more details.

Evidence Supporting the Measure

Type of Evidence Supporting the Criterion of Quality for the Measure

A systematic review of the clinical research literature (e.g., Cochrane Review)

One or more research studies published in a National Library of Medicine (NLM) indexed, peer-reviewed journal

Additional Information Supporting Need for the Measure

Many care processes can influence readmission risk. In general, randomized controlled trials have shown that improvement in the following areas can directly reduce readmission rates: quality of care during the initial admission; improvement in communication with patients, their caregivers, and their clinicians; patient education; predischarge assessment; and coordination of care after discharge. Evidence that hospitals have been able to reduce readmission rates through these quality-of-care initiatives illustrates the degree to which hospital practices can affect readmission rates. Successful randomized trials have reduced 30-day readmission rates by 20% to 40% (Jack et al., 2009; Coleman et al., 2004; Courtney et al., 2009; Garasen, Windspoll, & Johnsen, 2007; Koehler et al., 2009; Mistiaen, Francke, & Poot, 2007; Naylor et al., 1994; Naylor et al., 1999; van Walraven et al., 2002; Weiss, Yakusheva, & Bobay, 2010; Krumholz et al., 2002). Since 2008, 14 Medicare Quality Improvement Organizations have been funded to focus on care transitions, applying lessons learned from clinical trials. Several have been notably successful in reducing readmissions. The strongest evidence supporting the efficacy of improved discharge processes and enhanced care at transitions is a randomized controlled trial by the Project RED (Re-Engineered Discharge) intervention, in which a nurse was assigned to each patient as a discharge advocate, responsible for patient education, follow-up, medication reconciliation, and preparing individualized discharge instructions sent to the patient's primary care provider and there was a follow-up phone call from a pharmacist within 4 days of discharge demonstrated a 30% reduction in 30-day readmissions (Jack et al., 2009). Hospital processes that reflect the quality of inpatient and outpatient care such as discharge planning, medication reconciliation, and coordination of outpatient care have been shown to reduce readmission rates (Nelson, Maruish, & Axler, 2000). Although readmission rates are also influenced by hospital system characteristics, such as the bed capacity of the local health care system, these hospital characteristics should not influence quality of care (Fisher et al., 1994). Therefore, this measure does not risk adjust for such hospital characteristics.

Studies have estimated the rate of preventable readmissions to be as low as 12% and as high as 76% (Benbassat & Taragin, 2000; Medicare Payment Advisory Commission [MedPAC], 2000). Given that studies have shown readmissions to be related to quality of care, and that interventions have been able to

reduce 30-day readmission rates, it is reasonable to consider an all-condition readmission rate as a quality measure.

The hospital-wide risk-standardized readmission rate (RSRR) measure is thus intended to inform quality-of-care improvement efforts, as individual process-based performance measures cannot encompass all the complex and critical aspects of care within a hospital that contribute to patient outcomes. As a result, many stakeholders, including patient organizations, are interested in outcomes measures that allow patients and providers to assess relative outcomes performance for hospitals.

Evidence for Additional Information Supporting Need for the Measure

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Medicare Payment Advisory Commission (MedPAC). Report to the Congress: promoting greater efficiency in Medicare. Washington (DC): Medicare Payment Advisory Commission (MedPAC); 2007 Jun. 277 p.

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Extent of Measure Testing

Assessment of Updated Models

The hospital-wide readmission (HWR) measure estimates hospital-specific 30-day all-cause risk-standardized readmission rates (RSRRs) using a hierarchical logistic regression model. Refer to Section 2 in the original measure documentation for a summary of the measure methodology and model risk-adjustment variables. Refer to prior methodology and technical reports for further details.

The Centers for Medicare & Medicaid Services (CMS) evaluated and validated the performance of the models, using the July 1, 2015 to June 30, 2016 data for the 2017 reporting period. They examined the differences in the frequencies of patient risk factors and the model variable coefficients by specialty cohort.

For each of the specialty cohorts, CMS assessed logistic regression model performance in terms of discriminant ability for the July 1, 2015 to June 30, 2016 period. They computed two summary statistics to assess model performance: the predictive ability and the area under the receiver operating characteristic (ROC) curve (c-statistic). The results of these analyses are presented in Section 4.2 in the original measure documentation.

Hospital Wide Readmission (HWR) 2017 Model Results

HWR Specialty Cohort Model Parameters and Performance

Table 4.2.1, Table 4.2.2, Table 4.2.3, Table 4.2.4, and Table 4.2.5 in the original measure documentation show the specialty cohort-level frequency of risk factors, risk-adjusted odds ratios (ORs) and 95% confidence intervals, and hierarchical logistic regression model variable coefficients and standard errors (SEs) for the July 1, 2015 to June 30, 2016 data sample. Table 4.2.6 in the original measure documentation presents the cohort-level model performance. Table 4.2.7 in the original measure documentation presents the number of index hospitalizations and observed readmission rates for each specialty cohort.

Refer to the original measure documentation for additional information.

Evidence for Extent of Measure Testing

Yale New Haven Health Services Corporation (YNHHSC), Center for Outcomes Research and Evaluation (CORE). 2017 all-cause hospital-wide measure updates and specifications report. Baltimore (MD): Centers for Medicare & Medicaid Services (CMS); 2017 Mar. 69 p.

State of Use of the Measure

State of Use

Current routine use

Current Use

not defined yet

Application of the Measure in its Current Use

Measurement Setting

Hospital Inpatient

Professionals Involved in Delivery of Health Services

not defined yet

Least Aggregated Level of Services Delivery Addressed

Single Health Care Delivery or Public Health Organizations

Statement of Acceptable Minimum Sample Size

Does not apply to this measure

Target Population Age

Age greater than or equal to 65 years

Target Population Gender

Either male or female

National Strategy for Quality Improvement in Health Care

National Quality Strategy Priority

Institute of Medicine (IOM) National Health Care Quality Report Categories

IOM Care Need

Not within an IOM Care Need

IOM Domain

Not within an IOM Domain

Data Collection for the Measure

Case Finding Period

Discharges July 1, 2015 through June 30, 2016

Denominator Sampling Frame

Patients associated with provider

Denominator (Index) Event or Characteristic

Institutionalization

Patient/Individual (Consumer) Characteristic

Denominator Time Window

not defined yet

Denominator Inclusions/Exclusions

Inclusions
An *index admission* is the hospitalization to which the readmission outcome is attributed and includes admissions for patients:

- Enrolled in Medicare Fee-for-Service (FFS) Part A for the 12 months prior to the date of admission, and during the index admission
- Aged 65 or over
- Discharged alive from a non-federal short-term acute care hospital
- Not transferred to another acute care facility

Refer to the original measure documentation for International Classification of Diseases, Tenth Revision (ICD-10) codes used to define the specialty cohorts and cohort exclusions for discharges on or after October 1, 2015. International Classification of Diseases, Ninth Revision (ICD-9) code lists for discharges prior to October 1, 2015 can be found in the *2016 All-Cause Hospital-Wide Measure Updates and Specifications Report: Hospital-Level 30-Day Risk-Standardized Readmission Measure* .

Exclusions

- Admitted to Prospective Payment System (PPS)-exempt cancer hospitals
- Without at least 30 days of post-discharge enrollment in Medicare FFS
- Discharged against medical advice
- Admitted for primary psychiatric diagnoses
- Admitted for rehabilitation

Admitted for medical treatment of cancer

Exclusions/Exceptions

not defined yet

Numerator Inclusions/Exclusions

Inclusions
This measure assesses unplanned readmissions, from any cause, within 30 days from the date of discharge from an index admission.

If a patient has more than one unplanned admission within 30 days of discharge from the index admission, only the first is considered a readmission. The measure assesses a dichotomous yes or no outcome of whether each admitted patient has any unplanned readmission within 30 days. If the first readmission after discharge is planned, any subsequent unplanned readmission is not considered in the outcome for that index admission because the unplanned readmission could be related to care provided during the intervening planned readmission rather than during the index admission.

Admissions are assigned to one of five mutually exclusive specialty cohort groups consisting of related conditions or procedures. For each specialty cohort group, the standardized readmission ratio (SRR) is calculated as the ratio of the number of "predicted" readmissions to the number of "expected" readmissions at a given hospital. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted based on the hospital's performance with its observed case mix and service mix.

Note: This outcome measure does not have a traditional numerator and denominator like a core process measure; thus, this field is used to define the outcome.

See the *2017 All-cause Hospital-wide Measure Updates and Specifications Report: Hospital-level 30-day Risk-standardized Readmission Measure* for more details.

Exclusions
Admissions identified as planned by the planned readmissions algorithm are not counted as readmissions. The planned readmission algorithm is a set of criteria for classifying readmissions and planned among the general Medicare population using Medicare administrative claims data. The algorithm identified admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The planned readmission algorithm has three fundamental principles:

A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);
Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and
Admissions for acute illness or for complications of care are never planned

The planned readmission algorithm uses a flow chart and four tables of specific procedure categories and discharge diagnosis categories to classify readmissions as planned. The flow chart and tables are available in the *2017 All-cause Hospital-wide Measure Updates and Specifications Report: Hospital-level 30-day Risk-standardized Readmission Measure*.

Numerator Search Strategy

Institutionalization

Data Source

Administrative clinical data

Type of Health State

Proxy for Outcome

Instruments Used and/or Associated with the Measure

- Hospital Wide Readmission (HWR) Flow Diagram of Inclusion and Exclusion Criteria and Specialty Cohort Assignment for the Index Admission
- Planned Readmission Algorithm Version 4.0 (ICD-10) Flowchart

Computation of the Measure

Measure Specifies Disaggregation

Does not apply to this measure

Scoring

Rate/Proportion

Interpretation of Score

Desired value is a lower score

Allowance for Patient or Population Factors

not defined yet

Description of Allowance for Patient or Population Factors

Risk-Adjustment Variables

In order to account for differences in case mix among hospitals, the measure adjusts for variables (that is, age and comorbid diseases) that are clinically relevant and have relationships with the outcome. Case mix differences among hospitals are based on the clinical status of the patient at the time of the index admission. Accordingly, only comorbidities that convey information about the patient at that time or in the 12 months prior, and not complications that arise during the course of the hospitalization, are included in the risk adjustment.

In order to account for differences in service mix among hospitals, the measure adjusts for the principal discharge diagnosis of the index admission (grouped into Agency for Healthcare Research and Quality [AHRQ] clinical classification software [CCS] diagnosis categories). Thus, for the cardiorespiratory, cardiovascular, neurology, and medicine specialty cohorts, the AHRQ CCS diagnosis categories used for risk adjustment are the same as those used to define each of these cohorts (refer to Table D.4, Table D.5, Table D.6, and Table D.7 in the original measure documentation). For the surgery/gynecology cohort, which is defined by AHRQ CCS procedure categories, the AHRQ CCS diagnosis category used for risk

adjustment is simply the AHRQ CCS diagnosis category that the principal discharge diagnosis for that surgical admission falls into.

For each patient, risk-adjustment variables are obtained from inpatient Medicare administrative claims data extending 12 months prior to, and including, the index admission.

The measure does not adjust for socioeconomic status (SES) because the association between SES and health outcomes can be due, in part, to differences in the quality of health care that groups of patients with varying SES receive. The intent is for the measure to adjust for age and clinical characteristics while illuminating important quality differences. As part of the NQF's endorsement process for this measure, the Centers for Medicare & Medicaid Services (CMS) completed analyses for the two-year Sociodemographic Trial Period. Although univariate analyses found that the patient-level observed (unadjusted) readmission rate is higher for dual-eligible patients (for patients living in lower AHRQ SES Index census block groups) and African-American patients compared with all other patients, analyses in the context of a multivariable model demonstrated that the effect size of these variables was small, and that the c-statistics for the model are similar with and without the addition of these variables.

Refer to Appendix D of the original measure documentation for the list of comorbidity risk-adjustment variables common to all specialty cohorts and the list of complications that are excluded from risk adjustment if they occur during the index admission.

Standard of Comparison

not defined yet

Identifying Information

Original Title

Hospital-wide all-cause unplanned readmission.

Measure Collection Name

National Hospital Inpatient Quality Measures

Measure Set Name

Readmission Measures

Submitter

Centers for Medicare & Medicaid Services - Federal Government Agency [U.S.]

Developer

Centers for Medicare & Medicaid Services - Federal Government Agency [U.S.]

Yale-New Haven Health Services Corporation/Center for Outcomes Research and Evaluation under contract to Centers for Medicare & Medicaid Services - Academic Affiliated Research Institute

Funding Source(s)

Centers for Medicare & Medicaid Services (CMS)

Composition of the Group that Developed the Measure

This measure was developed by a team of experts:

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Financial Disclosures/Other Potential Conflicts of Interest

None

Endorser

National Quality Forum - None

NQF Number

not defined yet

Date of Endorsement

2016 Dec 9

Measure Initiative(s)

Hospital Compare

Hospital Inpatient Quality Reporting Program

Adaptation

This measure was not adapted from another source.

Date of Most Current Version in NQMC

2017 Mar

Measure Maintenance

Annual

Date of Next Anticipated Revision

2018 Apr

Measure Status

This is the current release of the measure.

This measure updates a previous version: Specifications manual for national hospital inpatient quality measures, version 5.0b. Centers for Medicare & Medicaid Services (CMS), The Joint Commission; Effective 2015 Oct 1. various p.

Measure Availability

Source available from the QualityNet Web site .

Check the QualityNet Web site regularly for the most recent version of the specifications manual and for the applicable dates of discharge.

Companion Documents

The following are available:

Hospital compare: a quality tool provided by Medicare. [internet]. Washington (DC): U.S. Department of Health and Human Services; [accessed 2017 Oct 30]. Available from the Medicare Web site .

Yale New Haven Health Services Corporation (YNHHSC), Center for Outcomes Research and Evaluation (CORE). 2017 Medicare hospital quality chartbook. Baltimore (MD): Centers for Medicare & Medicaid Services (CMS); 2017. Available from the Centers for Medicare & Medicaid Services (CMS)

Web site .

NQMC Status

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Production

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